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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,849	01/11/2005	Gillian F Marshall	124-1102	2698
23117 7590 10/17/2007 NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203				
EXAMINER				
PIZARRO CRESPO, MARCOS D				
ART UNIT		PAPER NUMBER		
2814				
MAIL DATE		DELIVERY MODE		
10/17/2007		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/520,849

Applicant(s)

MARSHALL ET AL.

Examiner

Marcos D. Pizarro

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 8-11 and 15-23 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-14 is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☒ Claim(s) 4-7 is/are objected to.
- 8) ☒ Claim(s) 1-23 are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1/11/2005 and 4/6/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Attorney's Docket Number: 124-1102

Filing Date: 1/11/2005

Claimed Priority Dates: 7/3/2003 (371 of PCT/GB03/02851)
7/11/2002 (GB 0216075.2)

Applicant(s): Marshall et al.

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the election filed on 7/27/2007.

Acknowledgment

1. The amendment filed on 7/27/2007, responding to the Office action mailed on 5/29/2007, has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1-23.

Election/Restrictions

2. Applicant's election with traverse of species 2, figure 3, in the reply filed on 7/27/2007 is acknowledged. In their reply, the applicants indicated that claims 1-8, 12-14, 18, and 19 read on the elected species and that claims 1, 12, 15, 18, and 20 were generic to all the species. Claims 18-20 were previously withdrawn from consideration as being drawn to a nonelected invention (see Office action mailed on 5/29/2007). In addition, claim 8 reads on the non-elected species 3, fig. 4. Accordingly, claims 8-11 and 15-17 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as

being drawn to a nonelected species, there being no allowable generic or linking claim. Currently claims 1 and 12 are generic claims to all the species.

3. Applicants' traversal is on the grounds that although Parker does show first active regions **50** forming diodes with second active regions **70**, these diodes do not form an electrooptical junction. Although the examiner agrees, this is not found persuasive to overcome the lack of unity requirement.

4. In the restriction requirement, the examiner set forth that the two groups do not relate to a single general inventive concept because they lack the same or corresponding special technical features. The examiner clearly indicated that the special technical feature of the group II claims is the claimed implantation step and that this feature is not present in the group I. The special technical feature of the group I invention is the electrooptical junction and that although this feature was also present in the group II, the prior art shows an electrooptical junction. Although Parker's first **50** and second **70** active regions do not form an electrooptical junction, as indicated by the applicants, the prior art does show that electrooptical junctions were known in the art. See, *e.g.*, fig. 1, where Kobayashi (US5596186) shows an electrooptical junction comprising a first active region **13** with dopants of the opposite conductivity type to that of a handle substrate and a second active region **12** with dopants of the same conductivity type as the substrate. Since Kobayashi shows the electrooptical junction of Groups I and II was already known in the art, there is no special technical feature linking the groups. Therefore, unity of invention is lacking and the requirement between Groups I and II is made FINAL.

5. The applicants also traverse the lack of unity requirement between species as set forth in the Office action mailed on 5/29/2007. According to the applicants, the single general inventive concept of an APD in a substrate together with readout circuitry isolated from the substrate by an insulating layer is present in each of applicants' independent claims 1, 12, 15, 18, and 20. Thus, all claims share this feature and comprise the same invention, but differing in scope. The applicants argue that in view of this linking feature, the lack of unity requirement is improper and should be withdrawn. This is not found persuasive.

6. There is no recitation whatsoever in any of claims 12, 15, and 20 of an APD in a substrate together with readout circuitry. Therefore, unity of invention is lacking and the requirement between species is proper and made FINAL.

Specification

7. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by Pain (WO 00/21280).

10. Regarding claim 1, Pain shows (see, e.g., fig. 3) all aspects of the instant invention including a photodetector circuit **60** including a photodiode detector and associated readout circuitry, the circuit comprising:

- A semiconductor handle substrate **62** of one conductivity type supporting the readout circuitry
- An insulating layer **70** on the substrate electrically insulating the circuitry from the substrate

The photodiode detector comprising an avalanche photodiode having:

- A first active region **74** of the opposite conductivity type to the substrate incorporate in the substrate
- A second active region **78** of the same conductivity type as the substrate incorporated in the substrate
- An active electrooptical junction within the substrate between the first and second active regions

11. Regarding claim 2, Pain shows the insulating layer **70** on the substrate comprises SiO₂ (see, e.g., pp.10/II.26).

12. Regarding claim 3, Pain shows the circuitry comprises one MOS component (see, e.g., fig. 4).

Allowable Subject Matter

13. Claims 12-14 are allowed.

14. Claims 4-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

15. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 10:00 AM to 8:30 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

17. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system,

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contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

18. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/438, 458, 461, E23.063	10/14/2007
Other Documentation:	
Electronic Database(s): EAST (USPAT, EPO, JPO)	10/14/2007

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